AMENDMENT

This listing of claims replaces all prior versions, and listings, of claims for this application.

1. (Previously Presented) A process for obtaining a bulk gallium-containing nitride monocrystal, comprising:

contacting ammonia with a mineralizer comprising a Group I azide in a pressurized reaction vessel to form a supercritical ammonia-containing solution comprising an ion of a Group I element;

dissolving a gallium-containing feedstock at a dissolution temperature and pressure condition under which the gallium feedstock dissolves in the supercritical ammonia-containing solution; and

crystallizing a gallium-containing nitride on a surface of a seed at a crystallization temperature and pressure condition,

wherein the crystallization temperature and pressure condition is determined using a temperature coefficient of solubility and a pressure coefficient of solubility of the gallium-containing nitride to be crystallized.

2. (Previously Presented) A process for obtaining a bulk gallium-containing nitride monocrystal, comprising:

contacting ammonia with a mineralizer comprising a Group I azide in a pressurized reaction vessel at a condition under which a gallium-containing nitride has a negative temperature coefficient of solubility and a positive pressure coefficient of solubility, forming a supercritical ammonia-containing solution comprising an ion of a Group I element;

dissolving a gallium-containing feedstock at a dissolution temperature and pressure condition under which the gallium-containing feedstock dissolves in the supercritical ammonia-containing solution;

obtaining a super-saturation of the supercritical ammonia-containing solution at a crystallization temperature and pressure condition having a temperature higher than that of the

dissolution temperature and pressure condition or a pressure lower than that of the dissolution temperature and pressure condition; and

crystallizing a gallium-containing nitride on a surface of a seed by maintaining the super-saturation of the supercritical ammonia-containing solution at the level at which spontaneous crystallization of nitride is negligible.

3. (Previously Presented) The process according to claim 1, wherein gaseous nitrogen, produced during decomposition of the azide, is at least partially evacuated before the crystallizing step is started.

4. (Previously Presented) The process according to claim 1, wherein the crystallized gallium-containing nitride has a general formula $Al_xGa_{1-x}N$, where $0 \leq x < 1$.

5. (Previously Presented) The process according to claim 1, wherein the mineralizer is selected from the group consisting of LiN_3, NaN_3, KN_3, CsN_3 and mixtures thereof.

6. (Previously Presented) The process according to claim 5, wherein the mineralizer contains at least one compound selected from the group consisting of LiN_3, NaN_3, KN_3 and CsN_3.

7. (Previously Presented) The process according to claim 6, wherein the mineralizer contains NaN_3 and KN_3.

8. (Previously Presented) The process according to claim 6, wherein the mineralizer contains NaN_3 and LiN_3.

9. (Previously Presented) The process according to claim 6, wherein the mineralizer contains KN_3 and LiN_3.

10. (Previously Presented) The process according to claim 6, wherein the mineralizer further contains Group I element-containing compound other than azide.

11. (Previously Presented) The process according to claim 1, wherein the Group I azide is added in a molar ratio of azide to ammonia ranging from 1:200 to 1:2.

12. (Previously Presented) The process according to claim 1, wherein the seed comprises a crystalline layer of Group XIII element-containing nitride having a dislocation density less than 10^7 / cm^2.

13. (Previously Presented) The process according to claim 1, wherein the seed comprises a structure having a number of surfaces spaced apart from each other, arranged on a primary substrate and susceptible to a lateral overgrowth of a crystalline nitride.

14. (Previously Presented) The process according to claim 1, wherein a monocrystalline nitride layer that is obtained has the same or better quality as the gallium-containing nitride monocrystal gets thicker.

15. (Previously Presented) The process according to claim 13, wherein the seed contains the primary substrate made of a crystalline nitride of Group XIII element.

16. (Previously Presented) The process according to claim 15, wherein the seed contains the primary substrate made of gallium nitride.

17. (Previously Presented) The process according to claim 15, wherein the seed contains the primary substrate made of a crystalline material such as sapphire, spinel, ZnO, SiC or Si, and wherein the primary substrate made of a material reactive to a supercritical ammonia-containing solution is covered with a protective layer prior to formation of a monocrystalline nitride layer.

18. (Previously Presented) The process according to claim 1, wherein the bulk nitride monocrystal obtained consists essentially of gallium nitride.

19. (Previously Presented) The process according to claim 1, wherein the bulk nitride monocrystal obtained contains any of the following elements: Ni, Cr, Co, Ti, Fe, Al, Ag, Mo, W, Si and Mn.

20. (Previously Presented) The process according to claim 1, wherein a surface of the seed is covered with a mask layer prior to formation of a monocrystalline nitride layer.

21-30. (Canceled)

31. (Currently Amended) A method for creating an epitaxial layer on a nitride monocrystal, comprising:

~~obtaining a bulk nitride monocrystal by a process according to claim 1;~~

contacting ammonia with a mineralizer comprising a Group I azide in a pressurized reaction vessel to form a supercritical ammonia-containing solution comprising an ion of a Group I element;

dissolving a gallium-containing feedstock at a dissolution temperature and pressure condition under which the gallium feedstock dissolves in the supercritical ammonia-containing solution;

crystallizing a gallium-containing nitride on a surface of a seed at a crystallization temperature and pressure condition to obtain a nitride monocrystal,

wherein the crystallization temperature and pressure condition is determined using a temperature coefficient of solubility and a pressure coefficient of solubility of the gallium-containing nitride to be crystallized; and

growing an epitaxial layer on the nitride monocrystal.

32. (Previously Presented) The method of claim 31, wherein the bulk nitride monocrystal has at least one epitaxial layer of the same or different Group XIII element-containing nitride, deposited by a MOCVD, HVPE or MBE method as a template for opto-electronic devices.

33. (Original) The method of claim 32, wherein the epitaxial layer is doped with one or more dopants.

34-35. (Canceled)

36. (Previously Presented) A process according to claim 1, wherein the mineralizer further comprises a Group II azide and the supercritical ammonia-containing solution further comprises an ion of a Group II element.

37. (Previously Presented) A process according to claim 2, wherein the mineralizer further comprises a Group II azide and the supercritical ammonia-containing solution further comprises an ion of a Group II element.

38. (Previously Presented) A process according to claim 10, wherein the mineralizer further comprises a Group II element-containing compound other than an azide.

39. (Previously Presented) A process according to claim 17, wherein the protective layer comprises a Group XIII element-containing nitride or a metallic Ag.